

## President's Page

# Acute Coronary Syndromes

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**W**hen acute coronary syndromes, represented principally by acute myocardial infarction, coexist with other diseases such as heart failure, anaemia, diabetes mellitus, or chronic kidney failure, they are the leading cause of death, followed by traffic accidents and all types of cancer; indeed, acute coronary syndromes are the main killer in civilised societies today. Cardiovascular diseases are the leading cause of death in developed countries and are expected to reach the same point in developing countries by 2020. The term “acute coronary syndrome” has emerged as a practical and functional means of describing every symptomatology compatible with acute myocardial ischaemia. In recent years, significant progress has been noted in both the diagnosis and the therapeutic management of acute coronary syndromes. The coexistence of other conditions, such as anaemia, diabetes, heart failure, and chronic kidney failure, represents an additional problem in the treatment of acute coronary syndromes.

The term “acute coronary syndrome” refers to a spectrum of conditions compatible with acute myocardial ischaemia and/or infarction that are usually due to a sudden reduction in coronary blood flow. Acute coronary syndromes manifest as unstable angina, as myocardial infarction, with or without ST-segment elevation, and as sudden cardiac death. One key sign is ST-segment elevation or new-onset left bundle branch block on the electrocardiogram, which are an indication for immediate angiography and reperfusion therapy in order to restore the flow in a completely occluded coronary artery. The absence of persistent ST-segment elevation is indicative of non-ST-elevation acute coronary syndrome (NSTEMI-ACS). NSTEMI-ACS may be further subdivided based on markers of myocardial necrosis (notably troponin). If these markers are elevated and the clinical

picture is compatible, the patient is considered to exhibit non-ST-elevation myocardial infarction (NSTEMI). Otherwise, if the markers are negative, the patient has unstable angina. ST depression, or transient ST elevation and/or T wave inversion, may be present, but are not required for the diagnosis of NSTEMI. Electrocardiographic changes or the increase in troponin in isolation are not sufficient for the diagnosis of acute coronary syndromes, and should be evaluated together with the clinical picture. NSTEMI and unstable angina have a similar pathogenesis and clinical profile, but they differ in severity. In NSTEMI the ischaemia is quite severe, sufficient to cause myocardial injury, which leads to detectable quantities of markers of myocardial necrosis. Unstable angina may appear without objective signs of ischaemia (normal electrocardiogram and negative troponin), in which case the diagnosis depends on the patient's clinical status and the physician's interpretation and judgement. However, with the increase in sensitivity of tests for detecting troponin, the diagnosis of unstable angina is becoming increasingly rare.

Coronary artery disease is the most common cause of death worldwide. More than 7 million people die every year from coronary artery disease, which represents 12.8% of total deaths. In Europe, one man in six and one woman in seven die from myocardial infarction. In the United States, the mean age of patients with acute coronary syndromes is 68 years, and the ratio of men to women is around 3:2. Some patients have a history of stable angina, while in others the acute coronary syndrome is the first manifestation of coronary artery disease. It is estimated that in the United States every year more than 780,000 people will survive an acute coronary syndrome and of these around 70% have NSTEMI-ACS. Patients with NSTEMI-ACS usually have more accompanying dis-

eases, cardiac and non-cardiac, compared to patients with STEMI. In Europe the most complete STEMI registry was probably in Sweden, where the incidence is 66 cases per 100,000 per year. Similar data have also been reported from the Czech Republic, Belgium, and the USA. The incidence of STEMI decreased between 1997 and 2005 from 121 to 77 per 100,000, while the incidence of NSTEMI increased slightly from 126 to 132. The in-hospital mortality of unselected patients with STEMI in national registries in European countries ranges between 6% and 14%. Several recent studies showed a drop in the acute and long-term mortality of STEMI, in parallel with an increase in the use of reperfusion therapy, primary angioplasty, modern antithrombotic therapy, and secondary prevention.

The diagnosis of STEMI is based on clinical findings and on persistent ST-segment elevation on the electrocardiogram. Patients with STEMI should be treated immediately with reperfusion therapy, mainly primary angioplasty or thrombolysis. Primary angioplasty is the preferred treatment, but is not always available. Reperfusion therapy, with antiplatelet and anticoagulant medication, make up the main therapeutic management. In high-risk patients with an NSTEMI-ACS, an early invasive strategy is followed, which includes coronary angiography and prompt reperfusion of the myocardium at risk. The patient's outcome after invasive treatment is improved by the addition of aggressive medication with anti-ischaemic, anti-platelet, anticoagulant, and hypolipidaemic drugs.

In recent years, the increase in the use of documented therapeutic options in NSTEMI has been accompanied by a decrease in mortality. However, further efforts are needed to improve the patients' prognosis. The delay between the onset of symptoms and the instigation of procedures for treating STEMI remains large, and special emphasis should be placed on reducing the total ischaemic time, i.e. the time from the onset of symptoms to reperfusion. Calling the national first-aid centre immediately can reduce the delay in hospital transfer. Therefore, efforts should be made to inform, educate, and alert high-risk patients and their families. Apart from transportation, the ambulance service should also participate in the diagnosis and treatment of acute myocardial infarction. Teleconsultation between the ambulance and the cardiology referral centre would be ideal, but is available in only a few countries. There are data showing that appro-

priately trained paramedical staff can diagnose acute infarction and administer prompt reperfusion therapy, and that ambulances staffed by doctors (which are available in a few countries) are not essential for effective pre-hospital treatment. Given that pre-hospital thrombolysis is an attractive option for patients who present soon after the onset of symptoms, especially when the time required for hospital transfer is long, training of paramedical staff in the administration of thrombolysis is desirable, even in the era of primary angioplasty. The ambulance staff should be in a position to record an electrocardiogram and either to interpret it or to transmit it directly to specialised staff at the cardiology centre. The recording and the interpretation or transmission of a electrocardiogram before arrival at hospital may speed up the in-hospital treatment to a large degree and make prompt and effective reperfusion more likely.

In high-risk patients with NSTEMI-ACS and documented significant coronary artery occlusion, it is generally accepted that early invasive therapy should be applied. Low-risk patients with NSTEMI-ACS have been shown to benefit significantly from appropriate medication, which includes double antiplatelet therapy, anticoagulation, beta-blockers, angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers, and statins. Newer, more powerful antiplatelet drugs are indicated, regardless of the initial therapeutic strategy. The use of high-sensitivity cardiac troponin is an important aid to diagnosis; however, there is a parallel increase in the incidence of elevated troponin that is not associated with the rupture of atheromatous plaque. The diagnostic dilemma raised by these observations requires further research in order to determine the optimum use of this advanced biomarker.

In summary, acute coronary syndromes, in spite of the significant developments of recent years in their diagnosis and treatment, remain the main cause of morbidity and mortality worldwide. Continuing research aimed at a better understanding of the mechanisms of acute coronary syndromes, and at the same time the development of new therapeutic strategies, will lead to their better management. It is essential both to inform the patient, and to organise and coordinate health-care systems in order to achieve rapid diagnosis and prompt treatment. Finally, a basic aim continues to be prevention, which requires the adoption of a healthy way of life and the treatment of modifiable risk factors.